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मानक

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Mazdoor Kisan Shakti Sangathan

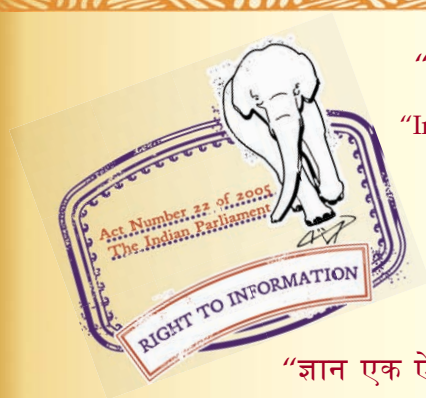
“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

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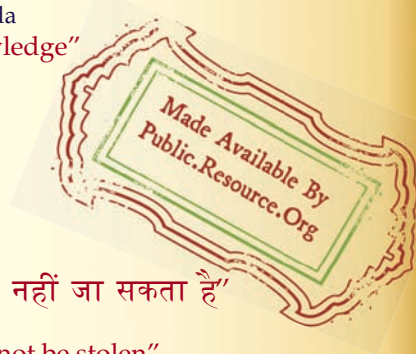
IS 4253-2 (2008): Cork composition sheets, Part 2: Cork and Rubber [MED 30: Gaskets and Packing]



“ज्ञान से एक नये भारत का निर्माण”

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“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक
कार्क संघटन शीट — विशिष्टि
भाग 2 कार्क और रबर
(दूसरा पुनरीक्षण)

Indian Standard
CORK COMPOSITION SHEETS — SPECIFICATION
PART 2 CORK AND RUBBER
(*Second Revision*)

ICS 674.833 : 621-762.4

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

FOREWORD

This Indian Standard (Part 2) (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Gasket and Packing Sectional Committee had been approved by the Mechanical Engineering Division Council.

This standard was originally published in 1968 and subsequently revised in 1980. In this revision Amendments No. 1 to 3 have been incorporated. The clauses with regard to sampling, dimensions, compressibility and recovery, flexibility test and fluid resistance have been modified.

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the results of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

AMENDMENT NO. 1 OCTOBER 2010
TO
IS 4253 (PART 2) : 2008 CORK COMPOSITION
SHEETS — SPECIFICATION

PART 2 CORK AND RUBBER

(Second Revision)

(Page 5, Table 1, col heading 6) — Substitute 'RC50-B' for 'RC50-A'.

{Page 5, Table 1, col heading 7) — Substitute 'RC70-B' for 'RC70-A'.

(Page 5, Table 1, col heading 8) — Substitute 'RC80-B' for 'RC80-A'.

(Page 5, Table 1, col heading 9) — Substitute 'RC50-C' for 'RC50-A'.

(Page 5, Table 1, col heading 10) — Substitute 'RC70-C' for 'RC70-A'.

(Page 5, Table 1, col heading 11) — Substitute 'RC80-C' for 'RC80-A'.

Indian Standard

CORK COMPOSITION SHEETS — SPECIFICATION

PART 2 CORK AND RUBBER

(Second Revision)

1 SCOPE

1.1 This standard (Part 2) specifies requirements for cork composition sheets for gaskets made by the compounding of granular cork with natural or synthetic rubber.

1.2 Three types of sheets are covered, and within each type, three grades. Type A is non-oil resistant, Type B has a good resistance to oil, and Type C has a very good resistance to oils and petrol.

2 REFERENCES

The following standards contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	Title
335:1993	New insulating oils (<i>fourth revision</i>)
460	Specification of test sieves :
(Part 1): 1985	Wire cloth test sieves (<i>third revision</i>)
(Part 2): 1985	Perforated plate test sieves (<i>third revision</i>)
2500	Sampling inspection procedures:
(Part 1): 2000	Part 1 Attribute sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection (<i>third revision</i>)
2967:1983	Specification for external micrometer (<i>first revision</i>)
3400	Methods of test for vulcanized rubber:
(Part 2): 2003	Rubber, vulcanized or thermoplastic — Determination of Hardness (Hardness between 10 IRHD and 100 IRHD) (<i>third revision</i>)

IS No.

Title

(Part 10): 1977	Compression set at constant strain (<i>first revision</i>)
4202:1967	Method for determination of chloride content of textile materials
4203:1967	Method for determination of sulphate content in textile materials

3 MATERIALS AND FINISH

3.1 The cork used for the manufacture of cork composition sheets shall be clean soft grade type uniformly granulated and practically free from hardboard, wood flour, dust, and other foreign material likely to be detrimental to the serviceability of the gaskets. The finished material shall be free from cracks or pinholes and shall be capable of being cut or punched without cracking or tearing.

3.2 Unless a particular grain size is specified by the purchaser, the size of the cork granules used shall be that which the manufacturer considers most suitable for the particular application. The granules shall be classified as follows:

- a) Fine : Passing through 1.00 mm IS Sieve and retained on 425 micron IS Sieve
- b) Medium : Passing through 2.00 mm IS Sieve and retained on 1.00 mm IS Sieve
- c) Coarse : Passing through 3.35 mm IS Sieve and retained on 2.00 mm IS Sieve

NOTE — For the Indian Standard Sieve designations and their equivalents according to BS, ASTM, Tyler, French and German Standards [see IS 460 (Part 1) and IS 460 (Part 2)].

4 THICKNESS

4.1 Standards preferred thicknesses are 1.0 mm, 1.2 mm, 1.5 mm, 1.8 mm, 2.0 mm, 2.5 mm, 3.0 mm, 3.5 mm, 4.0 mm, 4.5 mm, 5.0 mm, 5.5 mm, 6.0 mm, 7.0 mm, 8.0 mm, 9.0 mm, 10.0 mm, 11.0 mm, 12.0 mm, 13.5 mm and 15.0 mm.

Any other thickness may be used as agreed to between the purchaser and the manufacturer.

4.2 The permissible variation in thickness at any point on the sheet shall be ± 10 percent, for thickness up to 2.50 mm and ± 0.25 mm for thickness above 2.50 mm.

5 TYPES AND GRADES

The various types and grades of cork composition shall be identified by the designations given in Table 1, in accordance with their properties.

6 PROPERTIES

Cork composition sheets, when subjected to the conditioning procedure and the appropriate test as given in 8 shall have the properties given in Table 1.

7 SAMPLING

The sampling plan shall be as mutually agreed to between the manufacturer and the purchaser, in respect of tests to be conducted. In the absence of such agreement the sampling plan given in Annex A shall be followed.

8 TESTS

8.1 Conditioning

All test samples shall be conditioned in an atmosphere of 65 ± 2 percent relative humidity at $27 \pm 2^\circ\text{C}$ for 48 h prior to testing. Testing is preferably carried out in the standard atmosphere and shall be so performed in cases of dispute.

8.2 Dimensions

The thickness shall be measured by Grade 2 micrometer having an anvil of not less than 10 mm diameter (see IS 2967) or by Vernier. The thickness shall be within the variation specified at 4.1.

8.3 Dimensional Stability

8.3.1 Six test specimens at least of size 150 mm \times 150 mm shall be drawn from each sheet in the sample. At least six test specimens should be taken for each sample material, three for the high humidity and three for the low humidity tests. The samples should be cut 25.4 mm wide, and between 20 mm and 30 mm in length. The long direction should be in the direction that experiences the greatest dimensional change, generally the cross machine or against the grain direction. If there is doubt, both directions should be sampled, and the results of the direction with the greatest change reported.

8.3.2 Procedure

Measure test specimens to ± 0.025 mm and record values as initial readings. If the test specimen is marked for identification or measurement, be certain that the mark is easily visible and will withstand

exposure to heat and immersion in water.

8.3.2.1 Testing for dimensional stability to low humidity

Expose three prepared specimens in a forced hot-air oven set at $100 \pm 2^\circ\text{C}$ for 5 h. Remove specimens and allow to cool between 21° to 30°C in a desiccator containing anhydrous-calcium chloride or suitable desiccant material. Remeasure and record measurements as final readings.

8.3.2.2 Testing for dimensional stability to high humidity

Immerse three prepared specimens into a tray of deionized water to a depth of 12 mm for a 22 h period. For materials that are buoyant in water, a supported wire screen or expanded metal cover should be used with adequate weights to keep the specimens immersed at the specified depth. Be certain that the specimens are separated and able to expand in an unrestricted fashion. Remove specimens from water and lightly blot excess water from the surface of the specimens. Remeasure and record measurements as final readings.

8.3.3 Calculation of Results

Report the results as percent change to high or low humidity calculated from the following equations:

$$\text{High humidity } L = \frac{L_f - L_i}{L_i} \times 100$$

$$\text{Low humidity } L = \frac{L_f - L_i}{L_i} \times 100$$

where

L_i = initial length,

L_f = final length, and

L = change in length, in percent.

Calculate and report the average of the three individual specimens. Average percentage change of three specimens for low humidity and high humidity each shall meet the dimensional change requirements.

8.4 Tensile Strength

Three test specimens shall be cut from each sheet in the sample and tested for tensile strength on a tensile testing machine. The specimens shall be cut with a die or other suitable means to give clean cut edges. The specimens shall be 25 mm wide and 100 mm long and there shall be at least 30 mm grip in each jaw. The rate of traverse of jaw shall be 300 ± 30 mm/min. Load shall be applied and tensile strength calculated, in kPa. Where the test specimen breaks at the jaws the readings shall be disregarded. The average value

of tensile strength shall not be less than that specified in Table 1 for that type and grade.

8.5 Compressibility and Recovery

This shall be determined on any convenient apparatus which has two flat parallel platens. Overlapping the test specimen by at least 6 mm at any time between which the material can be placed and compressed and the movement of which shall be measured with a micrometer dial gauge or other suitable means. In case of sheets thicker than 6 mm, the thickness shall be brought down to 6.00 ± 0.2 mm.

8.5.1 Test specimens preferably circular ones cut from several random positions of the sheets in the sample, shall have an area of $400 \text{ mm}^2 \pm 5$ percent.

8.5.2 The test specimen conditioned as outlined in 8.1 shall be placed between the platen and its initial thickness t_1 , measured when the preload is 7 kPa ¹⁾. The load shall then be increased at a uniform rate until the pressure of $2\,800 \text{ kPa}$ is reached within $30 \pm 10 \text{ s}$ after which the load shall be maintained for a further period of $30 \pm 5 \text{ s}$. The thickness t_2 of the test pieces shall be determined. The major load shall then be reduced to preload (7 kPa) position and after $60 \pm 5 \text{ s}$ the thickness t_3 of the test pieces under test shall be measured. The compressibility and recovery shall be calculated as under:

$$\text{Compressibility, percent} = \frac{t_1 - t_2}{t_1} \times 100$$

$$\text{Recovery, percent} = \frac{t_1 - t_2}{t_1} \times 100$$

The value of the compressibility and recovery shall not be less than those specified in Table 1 for that grade.

8.6 Compression Set

The method of test shall be as described in IS 3400 (Part 10), the temperature of test being $110^\circ \pm 2^\circ \text{C}$ for 24 h and the recovery time shall be 1 h to 2 h.

8.6.1 Where material is less than 6mm thick, the test specimen should be built up to not to less than 6 mm thickness nor more than 12 mm.

8.6.2 At the end of the compression period the test specimens shall be removed and allowed to rest at room temperature and humidity for an hour before measuring thickness. The values of the compression set shall be as specified in Table 1.

8.7 Flexibility

Three test specimens (where possible 25 mm wide and of suitable length) shall be cut from each sheet in the sample from widely separated positions.

8.7.1 The test specimens shall be bent through 180° round a mandrel of diameter 3 times the thickness of the specimen for materials up to 3 mm thickness, or 4 times the thickness of the specimen for materials over 3 mm thick, the flexing being carried out at a rate of 1 min through 180° using figure pressure at ambient temperature. The requirement that there shall be no breakage shall imply no breakage through the granules of cork or separation of the granules. If any of the test specimens fails then a complete retest with another set of specimens shall be carried out and the material shall be deemed to comply only if all these test specimens show no breakage.

8.8 Fluid Resistance Test

Samples preferably of more than 25 mm^2 area shall be completely immersed by some suitable means in:

- Water for 3 h at 100°C , and
- 35 percent hydrochloric acid for 30 min.

On removal from fluids, the samples show no disintegration or deterioration in case of water and a slight deterioration in case of 35 percent hydrochloric acid.

For Type B and Type C immersion test in ASTM Oil No. 3 for 70 h at 100°C requirements mainly for automotive industry:

- For Type B, change in volume – 25 percent, *Max*
- For Type C, change in volume – 15 percent, *Max*

For Type C required in electrical industry immersion test may be conducted in transformer oil as per IS 335 for 70 h at 90°C to 100°C in such cases change in volume should not exceed 8 percent.

8.9 Chemical Test on Water Extract

When specified by the purchaser, chemical tests on water extract shall be performed to determine, if the material is free from corrosive impurities.

8.9.1 Draw 15 g of the material from each sheet in the sample in the form of cut pieces not larger than 3 mm cube and place them in a chemically resistant glass flask with 300 ml of distilled water. Boil for 1 h under a water-cooled reflux condenser having a ground-glass connection with the flask, after which the flask shall be immediately stopped and cooled to room temperature. Decant a portion of the water extract for determination of pH value. The electrometric method, with glass electrode, shall be used for this purpose. Filter the remainder of the water extract and use 100 ml of this for the determination of chlorides in accordance with 9 of

¹⁾ $1 \text{ kgf/cm}^2 = 98.0665 \text{ kPa}$.

IS 4202 and another 100 ml for determination of sulphates in accordance with 9 of IS 4203. The pH value, and the values of the chlorides and sulphate contents shall be as given in Table 1.

NOTES

1 For chlorides use the formula given in 9.2.3(a) of IS 4202

2 For sulphates use the formula given in 9.2.3(a) of IS 4203.

9 FUNGUS-PROOFING

When required by the purchaser, the cork composition sheets shall be treated to provide complete protection against microbiological attack by complete immersion in a suitable fungicide (such as a solution of *p*-nitrophenol or pentachlorophenol) for not less than 2 min followed by draining and drying.

10 MARKING

10.1 Cork composition sheets shall be marked with the following:

- Manufacturer's name or trade-mark (if any),
- Date of manufacture, and
- Grade.

The marking of the grades shall be such that it may be readily identified on a piece of 300 mm × 300 mm cut from any position of the sheet.

10.2 BIS Certification Marking

Cork composition sheets may also be marked with the Standard Mark.

10.2.1 The use of Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

11 PACKING

Cork composition sheets shall be suitably packed to prevent damage.

12 STORAGE

Cork composition sheets shall not be stored under conditions of temperature, humidity or for reasonable period of time, which are likely to cause deterioration.

ANNEX A

(Clause 7)

SCALE OF SAMPLING AND CRITERIA FOR CONFORMITY

A-1 SCALE OF SAMPLING

A-1.1 Lot

In any consignment, all the cork composition sheets of the same dimensions and grade shall be grouped together to constitute a lot.

A-1.2 For ascertaining the conformity of the lot to the requirements of this standard, tests shall be carried out from each lot separately. The number of cork composition sheets to be selected at random for this purpose and shall be according to Table 1 of IS 2500 (Part 1). Inspection level, general and special, shall be as agreed to between the manufacturer and the purchaser.

It shall be ensured that lots containing 2.5 percent or less defectives will be accepted most of the times for dimensional requirements and no defective will be accepted in case of other requirements.

A-1.2.1 To ensure the randomness of selection, random number tables as agreed to between the buyer and the supplier shall be used. In case the tables are not available, the following procedure may be followed:

Starting from any item in the lot count all the items

in one order as 1, 2, 3...etc, up to r and so on, where ' r ' is the integral part of N/n (N being the number of items in the lot and n the number of items to be selected). Every ' r 'th item thus counted shall be withdrawn to constitute the sample.

A-1.2.2 If the cork composition sheets are packed in different packages, a suitable number of packages (not more than 20 percent of the total in the lot) shall be selected at random and the required number of cork composition sheets shall be drawn, as far as possible, equally from the packages selected.

A-2 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

After conforming dimensional requirements, a number of cork composition sheets (as per special inspection level) shall be subjected to the tests for density, tensile strength, compression and recovery, dimensional stability, immersion and water soluble matter. All cork composition sheets in the sample size (special inspection level) shall meet the other requirements of this specification for conforming of the lot.

The lot shall be declared conforming to the requirements of this standard, if it satisfies the above requirements.

Table 1 Properties of Cork Composition Sheets

(Clauses 5, 6, 8.4, 8.5.2, 8.6.2 and 8.9.1)

SI No.	Property	Type A (Non-oil Resistant)			Type B (Good Oil Resistant)			Type C (Very Good Oil Resistant)			Method of Test, Ref to
		RC50-A (3)	RC70-A (4)	RC80-A (5)	RC50-A (6)	RC70-A (7)	RC80-A (8)	RC50-A (9)	RC70-A (10)	RC80-A (11)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	Hardness, IRHD	50 ± 5	70 ± 5	80 ± 5	50 ± 5	70 ± 5	80 ± 5	50 ± 5	70 ± 5	80 ± 5	IS 3400 (Part 2) : 1995
ii)	Dimensional changes, percent, <i>Max</i>	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	See 7.3
iii)	Tensile strength, kPa, <i>Min</i>	650	900	1 250	700	1 250	1 550	1 250	1 550	1 900	See 7.4
iv)	Compressibility (at 2 800 kPa), percent	45-65	30-45	15-30	45-60	35-50	25-35	35-45	25-35	15-25	See 7.5
v)	Recovery, percent, <i>Min</i>	80	80	75	80	80	75	80	80	75	See 7.5
vi)	Compression set, percent, <i>Max</i>	90	90	90	80	85	90	80	85	90	See 7.6
vii)	Chemical test on water extract: a) pH, where applicable b) Chloride content (as chloride ion) c) Sulphate content (as sulphate ion)	5.0 to 8.5 0.2 percent, <i>Max</i> 0.2 percent, <i>Max</i>			5.0 to 8.5 0.2 percent, <i>Max</i> 0.2 percent, <i>Max</i>			5.0 to 8.5 0.2 percent, <i>Max</i> 0.2 percent, <i>Max</i>			See 7.9
Gaskets suitable for		General purpose only Light electrical and general automotive industry			Automotive industry Light electrical and general automotive industry			Automotive industry Heavy electrical industry Ship building and maintenance Aircraft industry			—

ANNEX B

(Foreword)

COMMITTEE COMPOSITION

Gasket and Packing Sectional Committee, MED 30

<i>Organization</i>	<i>Representative(s)</i>
IIT Kharagpur, West Bengal	SHRI AJIT K. BANTHIA (<i>Chairman</i>)
Banco Products (India) Ltd, Vadodara	SHRI V. K. GUPTA SHRI S. SELVAKUMAR (<i>Alternate</i>)
Bharat Bijlee Ltd, Mumbai	SHRI R. S. MURALEEDHARAN SHRI V. D. DEODHAR (<i>Alternate</i>)
Bharat Corrub Industries, Vadodara	SHRI B. M. TOLIA SHRI S. MOHAN (<i>Alternate</i>)
Bharat Heavy Electricals Ltd, Tiruchirappalli	SHRI S. KUMAR SHRI A. V. NARASINGA RAO (<i>Alternate</i>)
Crompton Greaves Ltd, Mumbai	SHRI P. S. RAMACHANDRAN
Department of Industrial Policy & Promotion, New Delhi	SHRI SHAISH KUMAR SHRI M. Z. KHAN (<i>Alternate</i>)
Fenner (India) Ltd, Madurai	SHRI V. SRINIVASAN SHRI R. P. D. R. BOSE (<i>Alternate</i>)
Ferolite Jointings Ltd, Ghaziabad	SHRI AKSHAY SHARMA SHRI F. C. SHARMA (<i>Alternate</i>)
Hindustan Petroleum Corporation Ltd, Visakhapatnam	SHRI Y. SRIRAMULU SHRI S. CHAKRADHAR (<i>Alternate</i>)
Hyderabad Industries Ltd, Ballabgarh (Faridabad)	SHRI (Dr) V. K. SINGH SHRI ARUN ISSAR (<i>Alternate</i>)
I.G.P. Engineers Pvt Ltd, Chennai	SHRI G. GANESAN SHRI A. V. PARTHASARTHY (<i>Alternate</i>)
Kirloskar Oil Engines Ltd, Pune	SHRI A. D. DANI SHRI R. L. HAROLIKAR (<i>Alternate</i>)
Nu-Cork Products Pvt Ltd, Gurgaon	SHRI S. K. DATTA
Ordnance Factory Board, Jabalpur	SHRI RAJNISH LODWAL SHRI M. K. MISHRA (<i>Alternate</i>)
Research, Designs and Standards Organization, Lucknow	SHRI A. K. MANDAL SHRI I. S. DAS (<i>Alternate</i>)
Rites Ltd, Gurgaon	SHRI S. B. MALIK SHRI D. K. SINGH (<i>Alternate</i>)
Superlite Jointings Pvt Ltd, Ghaziabad	SHRI S. K. DAVE SHRI MADHUKAR SINGH (<i>Alternate</i>)
Super Waudite Jointing Pvt Ltd, Ahmedabad	SHRI PRADEEP J. PANDYA SHRI C. D. GAZDAR (<i>Alternate</i>)
Talbro Private Ltd, Faridabad	SHRI BALRAJ TANWAR SHRI PARVEEN SHARMA (<i>Alternate</i>)
Tata Power Company Ltd, Mumbai	SHRI ASHOK SETHI SHRI V. V. NAMJOSHI (<i>Alternate</i>)

Organization

The Premier Automobiles Ltd, Mumbai

Uni Klinger Limited, Pune

Victor Gaskets India Ltd, Nasik

BIS Directorate General

Representative(s)

SHRI P. P. KINI

SHRI BHARAT BHUSHAN (*Alternate*)

SHRI S. K. KAGALKAR

SHRI M. S. SHANKAR

SHRI DILIP PALVE (*Alternate*)

SHRI C. K. VEDA, Scientist 'F' & Head (MED)
[Representing Director General (*Ex-officio*)]

Member Secretary

SHRI T. V. SINGH

Scientist 'E' (MED), BIS

Bureau of Indian Standards

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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc: No. MED 30 (0801).

Amendments Issued Since Publication

Amendment No.	Date of Issue	Text Affected

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